Cost-effectiveness of a behavioral intervention for seropositive youth
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The study examined was a behavioral intervention for young people living with the human immunodeficiency virus (HIV) (YPLH). The intervention comprised 11 sessions, and was aimed at reducing transmission behaviour (i.e. substance abuse and unprotected sexual acts).

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis and cost-utility analysis.

Study population
The study population comprised male YPLH whose behaviour placed their sexual partners at risk of acquiring HIV. Although the intervention was targeted at YPLH, the outcome (infections averted) was estimated from their sexual partners.

Setting
The setting was tertiary care (i.e. adolescent clinical care sites). The study was developed considering four acquired immunodeficiency syndrome (AIDS) epicentres (Los Angeles, New York, San Francisco and Miami) in the USA.

Dates to which data relate
The effectiveness data were collected from a trial carried out between 1994 and 1997, and also from a review of other papers published between 1997 and 1998. The resource use and cost data appear to have been collected from the trial (1994 - 1997), but a specific price year was not given.

Source of effectiveness data
The effectiveness data were derived from a review of studies.

Modelling
A mathematical model of HIV transmission (Pinkerton and Abramson 1993 and 1998, see 'Other Publications of Related Interest' below for bibliographic details) was refined to estimate the cost-effectiveness of the interventions considered at analysis. The time horizon appears to have been one year.

Outcomes assessed in the review
The outcomes assessed were:
the probability of a male or female partner being HIV infected by his or her male partner;
the probability of being receptive to an anal sexual act;
the probability of being receptive to an oral sexual act;
HIV transmission by receptive anal intercourse, receptive vaginal intercourse, receptive oral sex, and insertive anal or vaginal intercourse;
condom effectiveness with anal sex; and
condom effectiveness with vaginal or oral sex.

**Study designs and other criteria for inclusion in the review**
One multi-centred non-randomised trial was included in the review. The designs of the other reviewed studies were not reported.

**Sources searched to identify primary studies**
Not stated.

**Criteria used to ensure the validity of primary studies**
Not stated.

**Methods used to judge relevance and validity, and for extracting data**
Not stated.

**Number of primary studies included**
Seven primary studies were included in the review.

**Methods of combining primary studies**
Not stated.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
The probability of being HIV infected was 0.67 (Range: 0.57 to 0.77) for a male partner of a YPLH male and 0.33 (Range: 0.23 to 0.43) for a female partner of a YPLH male.

The probably of being receptive to an anal sexual act was 0.45 (Range: 0.35 to 0.55) for a partner younger or the same age as the YPLH male, and 0.65 (Range: 0.55 to 0.75) for an older partner.

The probability of being receptive to an oral sexual act was 0.45 (Range: 0.35 to 0.55) for a younger or same age partner, versus 0.65 (Range: 0.55 to 0.75) for an older partner.

The probability of HIV transmission was 0.02 (Range: 0.008 to 0.32) after receptive anal intercourse, 0.001 (Range: 0.0005 to 0.0015) after receptive vaginal intercourse, 0.00004 (Range: 0.00001 to 0.00007) after receptive oral sex, and 0.0006 (Range: 0.0003 to 0.0009) after insertive anal or vaginal intercourse.
Condom effectiveness was 90% (Range: 80 to 100) with anal sex and 95% (Range: 90 to 100) with vaginal or oral sex.

**Methods used to derive estimates of effectiveness**
The authors made some assumptions to derive estimates of effectiveness.

**Estimates of effectiveness and key assumptions**
The following assumptions were formulated:

- the consequences of superinfection (reinfection) were null;
- the transmission probability for an insertive oral act was zero;
- where a participant had more than five partners, the behaviour patterns for any subsequent partners were assumed to be similar to the previous five, while serostatus was treated as unknown;
- the immediate effects of the intervention lasted 3 months (although an alternative scenario was considered in which effectiveness persisted for a further 9 months, during which effectiveness declined by 25% each quarter).

**Measure of benefits used in the economic analysis**
The outcome measures used in the economic analysis were HIV infections averted over the course of 3 months and 12 months, and the quality-adjusted life-years (QALYs) gained. HIV infections averted were derived from the mathematical model, while QALYs were obtained directly from the literature (Holtgrave and Pinkerton 1997, see 'Other Publications of Related Interest' below for bibliographic details).

**Direct costs**
The direct costs included in the analysis appear to have been those of the health service. They included personnel, transportation, materials, food costs, facilities, childcare for participants, monetary incentives which were given as reimbursement for participants' time, and training for the session facilitator. All these costs were actual costs incurred by the programme, and included 24% overhead costs. The resource quantities and costs were reported separately. The costs were discounted at a rate of 3%. The sources and dates pertaining to the measurement of the resource quantities and unit costs were not given, but it would appear that these were collected during the course of the trial (i.e. 1994 to 1997) and related to the authors' setting. The price year was not given. The authors presented the total cost of the programme and the average cost per participant.

**Statistical analysis of costs**
There was no statistical analysis of the costs.

**Indirect Costs**
No indirect costs were reported.

**Currency**
US dollars ($).

**Sensitivity analysis**
A sensitivity analysis was conducted on each of the probability parameters employed to estimate effectiveness. One-way sensitivity analyses using the highest and lowest values for each parameter were conducted, to find extreme estimates for the number of infections averted. The authors also reported to have tested the sensitivity around the
discount rate, using values of 0% and 5%.

**Estimated benefits used in the economic analysis**
The intervention averted 2.02 HIV transmissions per 1,000 YPLH over a 3-month period (Range: -0.01 to 7.99).

Over a 12-month period, the number of infections per 1,000 YPLH averted by the intervention would be 5.05.

The intervention appeared to generate 10.32 QALYs per HIV infection averted.

**Cost results**
The total cost of the programme was $64,666 and the average cost per participant was $522. The cost of doing nothing appears to have been considered null. The authors reported that the average discounted lifetime treatment cost incurred per HIV infection would be $195,000.

**Synthesis of costs and benefits**
The costs and benefits were combined by calculating a cost-effectiveness ratio (as the cost per infection averted and the cost per QALY saved).

The cost per QALY was estimated by subtracting the treatment costs saved because of infection averted (i.e. the number of infections in 1 year multiplied by the average discounted lifetime treatment costs) from the cost of the programme, and then dividing this by the total number of QALYs saved (i.e. infections averted multiplied by the QALYs saved per participant's partner).

The cost-effectiveness ratios were $258,418 per infection averted over 3 months, $103,366 per infection averted over 12 months and -$8,879 per QALY saved (i.e. the intervention dominated the control since it was less costly and more effective).

The range in cost-effectiveness was $139,572 to $2,175,000 for infections averted over 3 months, and -$13,486 to $65,407 per QALY gained.

**Authors' conclusions**
The intervention appears to have reduced human immunodeficiency virus (HIV) transmission rates and increased the number of quality-adjusted life-years (QALYs) gained at cost-effectiveness ratios that compare favourably with ratios calculated for other common medical interventions. The cost-utility analysis suggested that there may be net financial benefits of this intervention for young males living with HIV because the savings in treatment costs exceed the cost of the intervention itself.

**CRD COMMENTARY - Selection of comparators**
Although no explicit justification was given for the choice of the comparator, doing nothing appears to have represented current practice in the authors’ setting. You should decide if this is current practice in your own setting.

**Validity of estimate of measure of effectiveness**
The effectiveness data were derived from a review of the literature, mainly from one non-randomised clinical trial. Details of the trial were reported, but the methods used to select and assess the included studies were not given. The review does not appear to have been systematic. In addition, the unavailability of data meant that the authors had to formulate several assumptions.

**Validity of estimate of measure of benefit**
The authors employed an estimate of QALYs, as given in the published literature.

**Validity of estimate of costs**

Although the authors stated that a societal perspective was adopted in the study, the indirect costs relating to lost productivity due to HIV-transmitted infections were not considered in the cost analysis. The resources included in the cost analysis appear to have been comprehensive from a health service perspective. Monetary incentives given to participants were included in the cost estimation, although it was unclear whether these costs would be part of clinical practice when implementing the intervention or if they were incurred in order to ensure participation. Resources associated with the scientific evaluation of the study were excluded, as the authors wished to estimate cost-effectiveness within a clinical rather than a research setting. It was unclear how discounting adjustments were performed; they appeared to be relevant only for the lifetime costs of HIV infections. Inflation adjustments were not reported, although they may have been required given that the cost data appear to have been collected over a 4-year period. No price year was stated, which may limit the generalisability of the study. The resource quantities were not reported separately, which would hinder reflation exercises in other settings.

**Other issues**

The authors acknowledged that they might have overestimated the cost per QALY gained as some estimates were developed in 1994 and, since then, antiretroviral therapies have lengthened life, improved quality of life, and increased the cost of treatment. The authors mentioned that the estimated cost per infection averted was comparable to that of other common medical interventions. The issue of the generalisability of the results to other settings was not addressed, although the results may only be generalisable for partners of male YPLH. Female YPLH were not considered in the study due to the lack of available data.

**Implications of the study**

The authors did not discuss any implications or requirements for further research.

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**Bibliographic details**


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**Other publications of related interest**


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